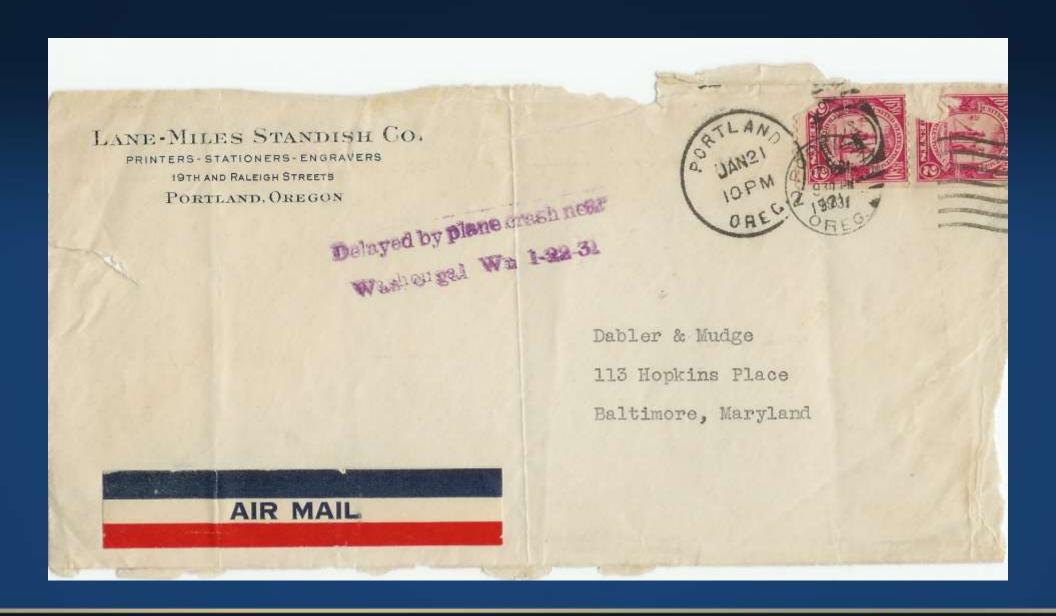
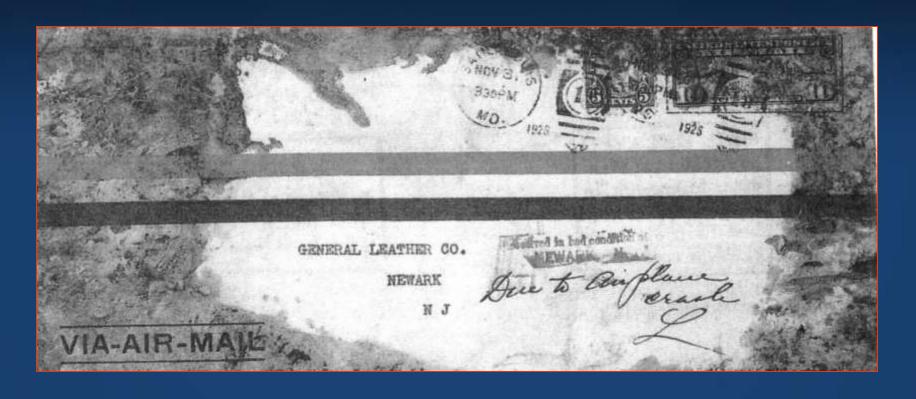


# **Investigating Fatigue in Transportation Accidents:**

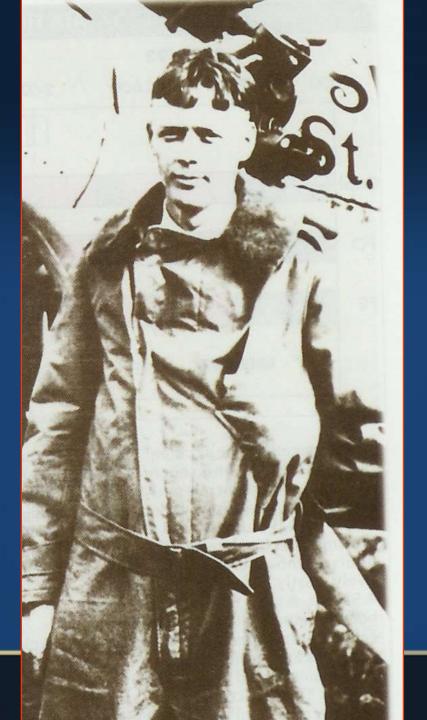
A Board Member's Perspective

Robert Sumwalt July 10, 2019

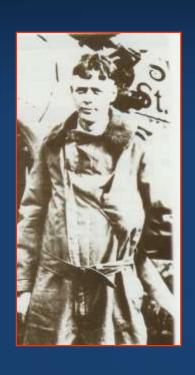




Nov 3, 1926 St. Louis - Chicago



## Charles A. Lindbergh

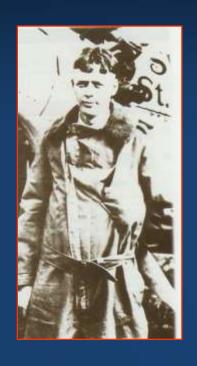


"My mind clicks on and off... I try letting one eyelid close at a time when I prop the other open with my will. But the effort's too much. Sleep is winning. My whole body argues dully that nothing, nothing life can attain is quite so desirable as sleep. My mind is losing resolution and control."

The Spirit of St. Louis
- Charles A. Lindbergh



NTSB Making Transportation Safer



"The nose is down, the wing low, the plane is diving and turning. I've been asleep with open eyes... I kick left rudder and pull the stick back...

"My eyes jump to the altimeter...I'm at 1600 feet. The turn-indicator leans over the left - the airspeed drops - the ball rolls quickly to the side...My plane is getting out of control!"

The Spirit of St. Louis
- Charles A. Lindbergh



#### Captain's record of failed FAA checkrides

Date of Checkride	Certificate Attempted	
October 1991	Instrument Rating	
May 2002	Commercial SEL	
March 2004	Commercial MEL	
October 2007	ATP and Saab 340 type rating	

## Additional training difficulties

Date	Difficulty Encountered	Checking Event
October 2005	graded "train to proficiency"	initial Saab 340 flight check
October 2006	unsatisfactory	recurrent Saab 340 flight check
October 2007	unsatisfactory	Saab 340 upgrade proficiency check

- Captain had not established good foundation of attitude instrument flying skills early in career
- Weaknesses in basic aircraft control and instrument flying continued

- Successful transition to Q400 in Dec. 2008
  - Flying Q400 for 2 months at time of accident
- Simulator instructor: captain was rough on flight controls and over-controlled roll axis
  - Consistent with previous aircraft control problems

### Role of Fatigue

#### Captain

- Reduced sleep opportunities
- Stayed overnight in crew room
- Accessed company computer at 0310
- Accident occurred at normal bedtime
- Had likely been awake for at least 15 hours at the time of the accident
- Sleep debt of 6 12 hours over the 3 days prior to the accident

### Role of Fatigue

- First officer
  - Overnight transcontinental commute
  - Slept on airplanes and in crew room

"This is one of those times that if I felt like this when I was at home there's no way I would have come all the way out here."

#### Probable Cause

The captain's inappropriate response to the activation of the stick shaker, which led to an aerodynamic stall from which the airplane did not recover.

#### Contributing to the accident:

- 1) the flight crew's failure to monitor airspeed in relation to the rising position of the low-speed cue
- 2) the flight crew's failure to adhere to sterile cockpit procedures
- 3) the captain's failure to effectively manage the flight
- 4) Colgan Air's inadequate procedures for airspeed selection and management during approaches in icing conditions.

# Two Prongs that Must be Met to Show Fatigue was a Factor in Accident's Causation



Did Fatigue
Adversely
Affect
Performance?

# Were the crewmembers fatigued?

Did fatigue adversely affect their performance?

# Did fatigue adversely affect their performance?

- Throughout the flight the pilots were engaged in conversation.
- Neither acted withdrawn, lethargic or made any statements about being tired or receiving inadequate sleep.

# Did fatigue adversely affect their performance?

- "The errors of the crew cannot be solely attributed to fatigue because of other explanations for their performance."
  - Monitoring error made by other crews, as well
  - Captain's errors consistent with his pervious performance deficiencies

# Did fatigue adversely affect their performance?

"The pilots' performance was likely impaired because of fatigue, but the extent of their impairment and the degree to which it contributed to the performance deficiencies that occurred during the flight cannot be conclusively determined."



### Comair Airlines Flight 5191 Lexington, Kentucky

- Bombardier CRJ
- 49 Fatalities
- First officer
   severely injured
- Wrong runway takeoff





## Air Traffic Controller Fatigue

### Saturday, August 26

- Worked from 0540 1430
  - Napped from 1530 1730
  - Ate dinner, ran, visited with friends
- Returned to work at 2325

### Sunday, August 27

- Scheduled to work until 0800
  - Accident occurred at 0606

### Air Traffic Controller Fatigue

- The controller had slept 2 out of the 24 hours preceding the accident.
- Time of day 0606

Was the controller fatigued?

Did fatigue adversely affect his performance?

# Did fatigue adversely affect his performance?

 The controller was not in the habit of monitoring takeoffs.

# Did fatigue adversely affect his performance?

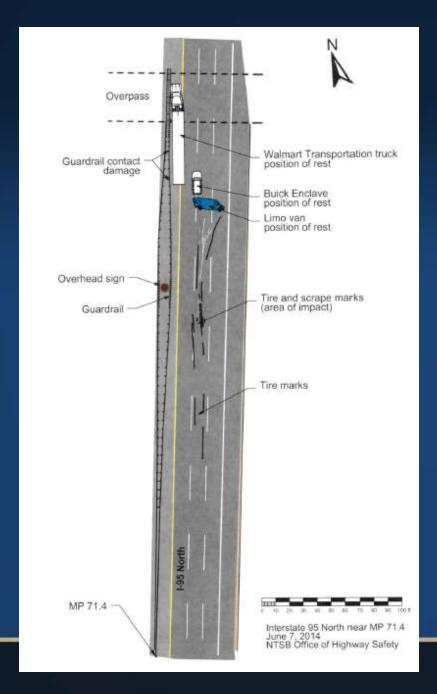
"The controller was most likely fatigued at the time of the accident, but the extent that fatigue affected his decision not to monitor the airplane's departure could not be determined in part because his routine practices did not consistently include the monitoring of takeoffs."

June 7, 2014









Truck skid marks began 95 feet south of the impact area

Did not respond to visible tail lights until appx. 200 ft.

No reaction to slowing traffic

Did not slow to comply with reduced speed limit

#### **Driver Factors**



- Departed Georgia
   between 8:30 pm and
   10:30 pm
  - Arrived in Delaware around11 am
  - 800 driving miles
- After arriving in Delaware, drove 451 miles
  - 13 hours, 32 minutes

#### **Driver Factors**

- 4 hours of sleep opportunity in previous 33 hours
- Awake more than 28 hours
- Missed sleep cycle
- Crash occurred at 12:55 am

# "I fell asleep"

#### Was the truck driver fatigued?

"The driver of the Walmart Transportation truck was fatigued due to his failure to obtain sleep before reporting for duty, resulting in acute sleep loss and excessive time awake." Did fatigue adversely affect his performance?

"Due to his fatigued condition, the Walmart Transportation truck driver had a delayed response to slowed traffic in an active work zone."

#### **Probable Cause**

"The Walmart Transportation truck driver's fatigue, due to his failure to obtain sleep before reporting for duty, which resulted in his delayed reaction to slowing and stopped traffic ahead in an active work zone and his operation of the truck at a speed in excess of the posted limit."





"I've got to find some way to keep alert.
There's no alternative but death and failure."